Geology

Lancaster High School

Name
Date
Block

The Rock Cycle Game

Problem/Question

Where do rocks come from?

Background:

The earth's crust has been forming for billions of years, and is still forming today. It contains a variety of rocks. Geologists can identify these rocks by name, such as marble or granite. They also group rocks based on how they formed. Rocks formed by the cooling of liquid rock, or *magma*, are known as **igneous**. Over time, the effects of wind, water, and other erosional processes can eventually harden together, forming **sedimentary** rocks.

Both igneous and sedimentary rocks may become buried in deeper layers of the earth's crust. These deeper layers are under more pressure and are hotter than the surface. Over time, high temperatures and pressure can cause one rock to change into another type of rock with different properties. For example, limestone, a soft sedimentary rock, can become marble, a hard rock often used in buildings. Rocks that have changed because of earth's heat and pressure are known as **metamorphic** rocks.

The table below shows some common rocks from each group.

Rock Type	**Examples**
Igneous	Basalt, granite, pumice, lava rock
Sedimentary	Limestone, shale, sandstone
Metamorphic	Marble, slate, gneiss, schist

Materials:

For each group of four students:

1 Rock Cycle activity board
1 set of 20 igneous rock cards
1 set of 20 metamorphic rock cards
1 set of 20 sedimentary rock cards
1 set of 9 earth process cards
4 game pieces
1 number cube

For each student:

1 Geologist's Notes student sheet

Procedure:

1. Give each person 9 Rock Cards: 3 igneous rocks, 3 metamorphic rocks and 3 sedimentary rocks.
2. Carefully read Geologist's Notes. During the activity, you will use this student sheet to keep track of what happens to your nine rocks, and explain how you gathered more rocks.
3. Sort the remaining Rock Cards by rock type and place them on the activity board in three separate stacks.
4. Place the Earth Process cards face down on the activity board in a single stack.
5. Place each person's activity piece on the start space.
6. Begin the activity by having each person roll the number cube. The person with the highest roll should start the game.
7. The first person should toss the number cube and move that number of spaces on the activity board. When someone lands on an Earth Process space, he or she should pick up an Earth Process card and follow the directions. After reading a card, replace it face down at the bottom of the stack.
8. Continue taking turns and playing. Remember, each person should record what happens to their rocks on Geologist's Notes. All new rocks should also be recorded on this sheet.
9. Stop playing when the first person has gone around the board twice.
10. Work with your group to answer questions 1-7 below.

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Geologist's Notes

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What type of rock did you collect, lose, or exchange?

Igneous		Sedimentary		Metamorphic	
What happened?	What caused this change?	What happened?	What caused this change?	What happened?	What caused this change?
Collected a new rock Lost a rock It became igneous It became metamorphic It became sedimentary		Collected a new rock Lost a rock It became igneous It became metamorphic It became sedimentary		Collected a new rock Lost a rock It became igneous It became metamorphic It became sedimentary	
Collected a new rock Lost a rock It became igneous It became metamorphic It became sedimentary		Collected a new rock Lost a rock It became igneous It became metamorphic It became sedimentary		Collected a new rock Lost a rock It became igneous It became metamorphic It became sedimentary	
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Analysis/Conclusions

Directions: Answer each of the following on a <u>in the space provided</u>.

1. How do igneous rocks form?
   Hint: On Geologist's Notes, look at what caused you to collect a new igneous rock or caused rocks to become igneous. Combine your results with those of the other members in your group.

2. How do sedimentary rocks form?
   Hint: On Geologist's Notes, look at what caused you to collect a new sedimentary rock or caused rocks to become sedimentary. Combine your results with those of the other members in your group.

3. How do metamorphic rocks form?
   Hint: On Geologist's Notes, look at what caused you to collect a new metamorphic rock or caused rocks to become metamorphic. Combine your results with those of the other members in your group.

4. Look at the three rock type columns on Geologist's Notes. Work with your group to identify which types of rocks can become:
   a. igneous:
   b. sedimentary:
   c. metamorphic:

5. What causes rocks to change from one type to another?
   Hint: On Geologists Notes, look at what caused you to lose rocks. Combine your results with the other members of your group.

6. Create a diagram using words and arrows to describe the relationship between igneous, sedimentary, and metamorphic rocks.

7. Where do rocks come from? Explain your answer.